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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/535,493
Filing Date: May 18, 2005
Appellant(s): WEST ET AL.

Stanley C. Spooner
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed August 12, 2008 appealing from the Office action mailed December 12, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

3,022,870	JOHN et al.	2-1962
4,697,970	HANSON	10-1987
3,659,896	SMITH et al.	5-1972
3,904,038	LESTER	9-1975
FR 2498671	CHERON	7-1982
JP 11072999	ISHIARA et al.	3-1999

"Handbook of Adhesive Technology", pp. 319-327 AKMAL et al. 1994

Appellants Specification Page 1 "The admitted prior art"

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 22 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by John et al. (U.S. Patent 3,022,870).

John discloses an assembly which forms part of a fuel storage system for an aircraft which comprises two components assembled and sealed together in a fluid-tight relationship each component having a mating surface sealed to the mating surface of the other component with a layer of cured polysulphide sealant therebetween (the Figure and Column 1, lines 10-20 and Column 2, lines 63-72 and Column 3, lines 1-23 and Column 4, lines 41-57).

Regarding the limitation "said assembly comprising at least one said mating surface having a layer of polysulphide sealant cured thereon prior to assembly", applicants claims 22 and 23 are to the "assembly", and this limitation is directed to the method of forming the assembly, i.e. "prior to assembly". John discloses all of the structure of the assembly required by claims 22

and 23 and as such anticipates the claims. (See in particular MPEP 2113 and "Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product.").

Claims 1-10, 14(1-10), and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over John in view of Cheron (FR 2498671 and see also the abstract), Ishiara et al. (JP 11072999 and see also the abstract), or Hanson (U.S. Patent 4,697,970).

John discloses a method of assembling components together in sealed relationship which form part of a fuel storage system for an aircraft comprising providing two components each component having a mating surface for sealing to the mating surface of the other component, applying a cured polysulphide sealant to at least one of the mating surfaces, bringing together the mating surfaces and applying a predetermined pressure therebetween for a predetermined period whereby to bring about a sealed fluid-tight joint between the two mating surfaces (the Figure and Column 1, lines 10-20 and Column 2, lines 63-72 and Column 3, lines 1-23 and Column 4, lines 41-57). John teaches bringing together the mating surfaces with the cured polysulphide sealant applies an accurate amount of the sealant, prevents the sealant from squeezing out from between the mating surfaces, and effectively adheres and seals the mating surfaces (Column 1, lines 32-35 and 68-70). John teaches the cured polysulphide sealant is applied to at least one of the mating surfaces by forming a sealant film between two protective coverings, curing the polysulphide sealant, removing the protective coverings, and then applying the sealant film (Column 2, lines 63-72 and Column 3, lines 1-23). John is silent as to applying the polysulphide sealant directly

to at least one of the mating surfaces without first forming a sealant film. However, it is well taken in the art that there are two functionally equivalent techniques available for providing an adhesive such as a sealant between the mating surfaces of two components to be joined which include providing the adhesive as a film or directly coating at least one of the mating surfaces with the adhesive as shown by Cheron, Ishiara, or Hanson (See the abstracts of Cheron and Ishiara and Column 5, lines 37-42 of Hanson). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the polysulphide sealant as taught by John to at least one of the mating surfaces (or both) by directly coating the sealant (and subsequently curing the sealant) as opposed to providing the sealant as a cured film as both coating the sealant directly on at least one of the mating surfaces and providing the sealant as a film were well taken in the art as functionally equivalent techniques as shown by any one of Cheron, Ishiara, or Hanson wherein directly coating at least one of the mating surfaces with the sealant has the advantage of not requiring a separate step of forming the sealant film.

Regarding the limitation of bringing together the mating surfaces after allowing the sealant to cure, John as modified by Cheron, Ishiara, or Hanson is considered to bring together the mating surfaces after allowing the sealant to cure as John requires the sealant be cured prior to bringing the mating surfaces together otherwise the sealant will squeeze out from between the mating surfaces preventing an accurate amount of sealant to be applied to effectively adhere and seal the mating surfaces.

Regarding claims 3-10, John teaches the application of pressure may be performed by bolting together the two components in their final assembled configuration (Column 3, lines 15-23). John is silent as to the specific heating temperature, pressure, and time for applying the

pressure. However, John teaches the adhesion of the sealant when pressed between the mating surfaces gradually increases over time (Column 3, lines 12-15), and John teaches heat may be applied to the sealant to speed the cure (Column 2, lines 71-72 and Column 3, lines 1-4). Absent any unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to experimentally determine the heating temperature, pressure, and time for applying the pressure to complete the joint of the two components as taught by John as a function of bringing about a sealed fluid-tight joint between the two mating surfaces as doing so would have required nothing more than ordinary skill and routine experimentation.

Regarding claim 14(1-10), John teaches the cured polysulphide sealant film is provided as stored between two protective coverings. There is no specific teaching in John as modified by Cheron, Ishiara, or Hanson that the components having a layer of cured polysulphide sealant thereon include a protective covering. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include on the cured polysulphide sealant taught by John as modified by Cheron, Ishiara, or Hanson a protective covering as was known in John such that the components having a layer of cured polysulphide sealant thereon my be stored prior to use.

Claims 11-13, 14(11-13), and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over John and Cheron, Ishiara, or Hanson as applied to claims 1-10, 14(1-10), and 20-23 above, and further in view of Smith et al. (U.S. Patent 3,659,896).

John and Cheron, Ishiara, or Hanson as applied above teach all of the limitations in claims 11-13, 14(11-13), and 15 except for a teaching of applying the polysulphide sealant to painted mating surfaces. Smith discloses a method of assembling components together

comprising providing two components each component having a mating surface for sealing to a mating surface of the other component, applying a cured polysulphide sealant to at least one of the mating surfaces, and bringing together the mating surfaces and applying a predetermined pressure therebetween for a predetermined period whereby to bring about a sealed fluid-tight joint between the two mating surfaces (Column 9, lines 48-58 and Column 10, lines 51-75). Smith teaches at least one of the mating surfaces may be painted such as for a painted automobile body wherein as there are no disclosed steps for treating the painted bodies such that Smith is considered to teach applying the polysulphide sealant immediately after the paint has dried (Column 2, lines 73-75 and Column 11, lines 6-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the polysulphide sealant as taught by John as modified by Cheron, Ishiara, or Hanson to painted mating surfaces of the components which form part of an aircraft body as it was known to use polysulphide sealants on painted automobile body components as shown by Smith such that the components may be sealed in their final configuration.

Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over John and Cheron, Ishiara, or Hanson as applied to claims 1-10, 14(1-10), and 20-23 above, and further in view of Akmal et al. ("Handbook of Adhesive Technology" pp. 319-327).

John and any one of Cheron, Ishiara, or Hanson as applied above teach all of the limitations in claims 16-19 except for a teaching of the polysulphide sealant including transition metal oxide, manganese dioxide, or dichromate curing compound, it being noted John are not limited to any particular curing compound and appear to suggest an organic-cure compound (Column 3, lines 48-55). It is extremely well known to cure polysulphide sealants with any of

transition metal oxide, manganese dioxide, dichromate, or organic-cure curing compounds as shown by Akmal (Page 323, second full paragraph). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the curing compound in John as modified by Cheron, Ishiara et al., or Hanson any of the extremely well known curing compounds for polysulphide sealant including transition metal oxide, manganese dioxide, dichromate, or organic-cure curing compounds as shown by Akmal only the expected results being achieved.

Claims 1, 3-10, 14(1 and 3-10), and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art (Specification page 1) in view of John.

The admitted prior art discloses a method of assembling components together in sealed relationship which form part of a fuel storage system for an aircraft comprising providing two components each component having a mating surface for sealing to the mating surface of the other component, applying a curable polysulphide sealant to at least one of the mating surfaces, bringing together the mating surfaces and applying a predetermined pressure therebetween for a predetermined period whereby to bring about a sealed fluid-tight joint between the two mating surfaces (Page 1, lines 9-24). The admitted prior art is silent as to curing the sealant prior to bringing together the mating surfaces, it being noted the admitted prior art does not specifically require the sealant is cured at any point. John similar to the admitted prior art discloses a method of assembling components together in sealed relationship which form part of a fuel storage system for an aircraft comprising providing two components each component having a mating surface for sealing to the mating surface of the other component, applying a cured polysulphide sealant to at least one of the mating surfaces, bringing together the mating surfaces and applying

a predetermined pressure therebetween for a predetermined period whereby to bring about a sealed fluid-tight joint between the two mating surfaces. John discloses bringing together the mating surfaces with the cured polysulphide sealant applies an accurate amount of the sealant, prevents the sealant from squeezing out from between the mating surfaces, and effectively adheres and seals the mating surfaces. It would have been obvious to one of ordinary skill in the art at the time the invention was made to cure the sealant as taught by the admitted prior art prior to contacting the mating surfaces as shown by John to apply an accurate amount of the sealant, prevent the sealant from squeezing out from between the mating surfaces, and effectively adhere and seal the mating surfaces.

Regarding claims 3-8 and 10, the admitted prior art is silent as to the specific heating temperature, pressure, and time for applying the pressure. Absent any unexpected results, it would have been obvious to one of ordinary skill in the art at the time the invention was made to experimentally determine the heating temperature, pressure, and time for applying the pressure to complete the joint of the two components as taught by the admitted prior art as modified by John as a function of bringing about a sealed fluid-tight joint between the two mating surfaces as doing so would have required nothing more than ordinary skill and routine experimentation.

Regarding claim 9, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the pressure as taught by the admitted prior art as modified by John by bolting the components together in their final configuration as was the general technique for forming assemblies of this type as shown by John such that further assembly is not required.

Regarding claim 14(1-10), John teaches the cured polysulphide sealant film is provided as stored between two protective coverings. There is no specific teaching in the admitted prior art as modified by John that the components having a layer of cured polysulphide sealant thereon include a protective covering. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include on the cured polysulphide sealant taught by the admitted prior art as modified by John a protective covering as was shown by John such that the components having a layer of cured polysulphide sealant thereon my be stored prior to use.

Claims 2 and 14(2) are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art and John as applied to claims 1, 3-10, 14(1 and 3-10), and 20-23 above, and further in view of Lester (U.S. Patent 3,904,038).

The admitted prior art and John as applied above except for a specific teaching of applying the sealant to both of the mating surfaces, it is unclear if the admitted prior art applies the sealant to one or both of the mating surfaces. It is well taken in the art of joining mating surfaces with an adhesive to coat one or both of the mating surfaces as shown by Lester (Column 1, lines 24-27). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the sealant as taught by the admitted prior art as modified by John to one or both of the mating surfaces as was considered well taken in the art and shown by Lester only the expected results being achieved.

Claims 11-13, 14(11-13), and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art and John as applied to claims 1, 3-10, 14(1 and 3-10), and 20-23 above, and further in view of Smith.

The admitted prior art and John as applied above teach all of the limitations in claims 11-13, 14(11-13), and 15 except for a teaching of applying the polysulphide sealant to painted mating surfaces. Smith discloses a method of assembling components together comprising providing two components each component having a mating surface for sealing to a mating surface of the other component, applying a cured polysulphide sealant to at least one of the mating surfaces, and bringing together the mating surfaces and applying a predetermined pressure therebetween for a predetermined period whereby to bring about a sealed fluid-tight joint between the two mating surfaces. Smith teaches at least one of the mating surfaces may be painted such as for a painted automobile body wherein as there are no disclosed steps for treating the painted bodies such that Smith is considered to teach applying the polysulphide sealant immediately after the paint has dried. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the polysulphide sealant as taught by the admitted prior art as modified by John to painted mating surfaces of the components which form part of an aircraft body as it was known to use polysulphide sealants on painted automobile body components as shown by Smith such that the components may be sealed in their final configuration.

Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art and John as applied to claims 1, 3-10, 14(1 and 3-10), and 20-23 above, and further in view of Akmal.

The admitted prior art and John as applied above teach all of the limitations in claims 16-19 except for a teaching of the polysulphide sealant including transition metal oxide, manganese dioxide, or dichromate curing compound. It is extremely well known to cure polysulphide sealants with any of transition metal oxide, manganese dioxide, dichromate, or organic-cure curing compounds as shown by Akmal. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use as a curing compound in the admitted prior art as modified by John any of the extremely well known curing compounds for polysulphide sealant including transition metal oxide, manganese dioxide, dichromate, or organic-cure curing compounds as shown by Akmal only the expected results being achieved.

Claims 22 and 23 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 22 of copending Application No. 11/020,873. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 22 and 23 are fully encompassed by claims 1 and 22 of copending Application No. 11/020,873.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

(10) Response to Argument

Appellants argue,

> "The claim phrases "after allowing the sealant to cure" and "cured thereon prior to assembly" both require curing of the polysulphide sealant prior to any assembly of the components, i.e., pre-assembly curing of the sealant. In the plain meaning of the English language, where material is less than fully "cured," such materials are considered to be "partially cured." Appellants' claims have no mention of the modifier "partially" in conjunction with the word "cured" and therefore anyone reading the claim language will clearly understand that the references are to completely cured materials.".

The terms "cure" and "cured" as interpreted by the examiner require the plain meaning of to harden, cross-linking of at least some of the polymer chains, etc. Appellants claims have no mention of the modifier "partially" in conjunction with the word "cured" in the same as appellants claims have no mention of the modifier "fully" in conjunction with the word "cured". The terms "cure" and "cured" are considered to encompass both partially and fully cured. Finally, it is noted that while a material that is less than fully cured may be considered partially cured the claims are not commensurate in scope with this argument as the claims do not require fully cured.

Appellants further argue,

> "While Appellant believes that "cured" is definite, should the Examiner believe otherwise, the specification clearly states on page 6, lines 18-20, that the polysulphide sealant utilized was placed in temperature and humidity controlled conditions for "14 days to fully cure" and that it was this fully cured sealant that was subsequently used in the assembly, i.e., the pre-assembly curing is required.".

Page 6, lines 18-20 of appellants specification discloses "A hardness button was prepared from the remaining material; this and the specimens were placed in a conditioning cabinet at 23 ^{o}C and 50% relative humidity for 14 days to fully cure.". Apellants specification further discloses on page 8, lines 12-13 "In addition, and separately, periods of 1 day, 3 days, 7 days, 14

days and 48 days have been tried". From the above it is noted: (1) Appellants specification does not specifically define "cured" as meaning "fully cured" rather the disclosure of "fully cure" is in reference to an example, (2) the claims do not require "fully cured" nor do the claims require the sealant is cured for 14 days, and (3) other periods of cure less than 14 days were described by Appellants specification which periods would be considered partially cured as it appears 14 days is required for fully cured.

Appellants further argue,

> "As an expert, it is well-settled law that Dr. Harris' testimony is to be considered factual evidence of record, transferring the burden of proof to the party whose opinion disputes the expert testimony. In paragraph 6 of his Declaration, Dr. Harris defines that "cured thereon" is a reference to a polysulphide sealant having the properties of a cured sealant, i.e., being "tack free," non-adherent "to other materials," "a Shore A hardness of approximately 39" and "good levels of environmental resistance."".

Paragraph 6 of the declaration submitted 6/19/08 describes "Claim 22 requires an assembly of surfaces "having a layer of polysulphide sealant cured thereon prior to assembly." A "cured" layer of polysulfide sealant is a sealant which has reached a Shore A hardness of approximately 39 and which is tack free, will not adhere to other materials e.g., glass or metal, upon contact or under light pressure, e.g., finger pressure, and which will have good levels of environmental resistance.". This argument is not persuasive as (1) Appellants specification does not disclose that a "cured" layer of polysulphide sealant has any of these properties and (2) the declaration does not show that the "cured" layer of polysulphide sealant by John does not have these properties.

Appellants further argue,

> "In paragraph 19, Dr. Harris confirms that in the time period specified in Appellants' specification, i.e., 14 days, the sealant is "approximately 99% cured and therefore this is the definition to the word 'cure' as used in the specification and the claims.".

The declaration demonstrates that "cured" requires nothing more than partially cured as the declaration discloses that the sealant which is described as "fully cured" in Appellants specification is only approximately 99% cured, i.e. less than 100% cured. In any event, the claims do not require "approximately 99% cured" or curing for 14 days, and as noted above Appellants specification describes time periods less than 14 days.

Appellants further argue,

> "There is no teaching in the John reference of applying sealant to at least one mating surface and then allowing the sealant to cure before bringing together mating surfaces. Instead, John teaches allowing a polysulphide sealant and other elements to partially cure for a short period of time at room temperature for subsequent cutting "into sheets or slit into narrow strips for subsequent packaging and use." He specifically teaches that the polysulphide mixture cures "in about 2 hours to a non-spreadable state" so the spreading and cutting must occur in less than 2 hours time.".

John does not require cutting must occur in less than 2 hours time nor does John require using the cured sealant before less than 2 hours of curing. John teaches at Column 2, lines 60-62 "The composite is permitted to stand at room temperature for at least about 4 hours, and is then cut into sheets or slit into narrow strips for subsequent packaging and use". John teaches at Column 4, lines 49-53 "One the cure is completed, the composite sheet may be cut into suitable widths and wound into rolls for storage, the adherent sealer film thereby being protected on both surface with the removable polyethylene sheet".

Appellants further argue,

> "Dr. Harris identifies at least four significant differences, i.e., (a) thicker sealant layer; (b) cured layer extends more uniformly; (c) the existence of "a sealant area in the area of the fasteners;" and (d) the sealant layer "will normally be in compression." Each of the above four are differences between the assembled product using pre-assembly curing of the sealant in accordance with the present invention as opposed to the assembled product using post-assembly curing as in John and the other prior art (see paragraphs 30 and 31 of the Harris Declaration).".

The declaration does not demonstrate via any quantitative result any of the above differences. Further, it is unclear how this conclusion is reached in view of the teachings in John that (1) the cured sealant layer does not flow (Column 2, lines 66-71) and the cured sealant layer does not squeeze out from the sealant area (Column 1, lines 32-37 and Column 3, lines 21-23), (2) the cured sealant is uniformly present as evidenced by forming a continuous sealing layer capable of withstanding the usual air pressures for aircraft (Column 1, line 68 to Column 2, line 2), and (3) the cured sealant forms a sealant area in the area of fasteners (Column 3, lines 15-23).

Appellant further argues,

> "As noted in Dr. Harris' discussion of the John reference, at paragraph 27, the John reference at column 3, lines 64-67 teaches away from a fully cured sealant because "an excessive cure, on the other hand, reduces the adhesive properties of the film to a degree which makes it difficult to apply in commercial sealing operations, e.g., in the assembling of an aircraft" As noted by Dr. Harris, this passage "clearly teaches away from the current invention.".".

It is unclear how this passage clearly teaches away from the current invention. John teaches at Column 3, lines 60-67 "Too low a cure results in a soft plastic film which in a riveted metal-to-metal seam, e.g. in an aircraft cabin, does not adequately prohibit leakage of air at 5-15 p.s.i. differential. An excessive cure, on the other hand, reduces the adhesive properties of the film to a degree which makes it difficult to apply in commercial sealing operations, e.g. in the assembling of an aircraft". John clearly teaches the sealant is cured thereby meeting the claim

limitations. John does teach an excessive cure reduces the adhesive properties. However, again the claims do require any particular extent of cure, and while the claims do not require the sealant is fully cured, "fully cure" does not require 100% cure as evidenced by the declaration such that the sealant could be considered fully cured without being excessively cured, i.e. 100% cured.

Appellants further argue,

> "Thus, the admitted prior art in Appellants' specification at page 1 clearly teaches away from Appellants' claimed combination of method steps involving pre-assembly curing of sealant. The specification details that which is done in the prior art, i.e., assemble the components first and then cure the sealant, i.e., post-assembly curing. Appellants' invention is pre-assembly curing, i.e., cure the sealant and then assemble the components and the benefits of such pre-assembly curing are detailed in Dr. Harris' Declaration, as noted above. There is no suggestion by the Examiner that these benefits are somehow obvious, other than with 20/20 hindsight.".

The admitted prior art does not specifically teach the polysulphide sealant must be cured post-assembly. Furthermore, the benefits of pre-assembly curing are expressly disclosed in John for a polysulphide sealant such that modifying the admitted prior art to include pre-assembly curing would have been *prima facie* obvious.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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Conferees:

/Yogendra N Gupta/

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